NOTES AND LITERATURE

PROTOZOA[1]

THAT so expensive and highly specialized a text-book as this of Doflein's should run through a whole edition in less than a year is a tribute to the excellence of the work and an index to the scientific activity in this field of biological research. An indication of the rapid progress now in the making in protozoology may be derived from the fact that every chapter in this elaborate work has been rewritten or substantially emended and the number of pages and illustrations increased by fifteen per cent. in this third edition, the second having been issued less than two years ago. The main changes include the insertion of a chapter on the origin of the Protozoa, the conception of species within the group, and the phenomena of variation and heredity as revealed by methods of culture and experiment, especially by the study of pure lines and the results of selection. Doflein calls attention to the appearance of direct adaptations in parasitic organisms in response to definite environmental factors in the form of chemical substances such as atoxyl and various compounds of arsenic and of antimony, unknown in the normal environment of the protozoan organism. These adaptations result in so-called resistant races and may be heritable. The possibility of control, the large numbers available and the rapidity of multiplication of these pathogenic organisms unite to open an inviting field, thus far too much neglected by the investigator in experimental evolution.

Considerable additions are made to the discussion of reproduction, especially to the maturation of the gametes, in which homologies to maturation in the Metazoa are becoming increasingly definite. The detailed discussion of the various groups of protozoa is noticeably extended in the case of the Spirochætes, the Hæmosporidia and the Sarcosporidia.

[1] "Lehrbuch der Protozoenkunde. Eine Darstellung der Naturgeschichte der Protozoen mit besonderer Berücksichtigung der parasitischen und pathogenen Formen." Dritte stark vermehrte Auflage. Von Dr. F. Doflein. xii + 1043 pp., mit 951 Abbildungen im Text. Jena, Gustav Fischer, 1911. M. 26, gb. M. 28.50.

Doflein is inclined to accept the evidence that Schaudinn's account of *Entamœba histolytica* is based in part upon phenomena attendant upon processes of degeneration and suggests that Viereck's *E. tetragena* is probably the most widespread form causing amœbic dysentery, and that the two are possibly identical, but that the organism according to the rigid laws of priority should be called *Entamœba dysenteriæ* (Councilman and Lafleur).

The doubtful group Chlamydozoa established by Prowazek for that group of immunizing organisms with a filterable virus, the supposed etiological factors in such diseases as vaccinia, variola, trachoma, molluscum contagiosum and epithelioma contagiosum, is still denied admittance by the author to the Protozoa on the ground that the minute structures described by Prowazek are not themselves with certainty proved to be living organisms. Doflein admits, however, that the evidence is constantly increasing that we have to do in the case of these diseases with parasitic organisms, but thinks they may be more closely related to the bacteria than to the protozoa.

It is a matter of regret that the non-parasitic groups, such, for example, as the pelagic Foraminifera and Radiolaria, and non-parasitic flagellates can not receive in a work of this sort commensurate treatment with pathogenic forms of confessedly great biological, as well as medical and hygienic interest. The author expresses the hope that medical research may in the near future so clear up contested points that less space will be required for the discussion of pathogenic forms. The present output is, however, not very promising for a reduction in extent in this field. The fact is that a six-volume edition of the Protozoa in Bronn's "Thiereich" is needed to give anything like an adequate review of the results now achieved in the fields of Protozoology.

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HEREDITY

H. M. Leake[14] gives additional results of his studies of inheritance in cotton. The flower color factors found were yellow, pale yellow and red, the latter being due to red sap color which showed not only in the flowers but in stems and leaves as well.

[14] "Studies in Indian Cotton," *Jour. of Gen.*, Aug., 1911.